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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,534	11/27/2001	James O'Keeffe	M-11825 US	8198

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PARSONS HSUE & DE RUNTZ LLP
655 MONTGOMERY STREET
SUITE 1800
SAN FRANCISCO, CA 94111

EXAMINER
ERDEM, FAZLI

ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 05/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/994,534	O'KEEFFE ET AL.	
	Examiner	Art Unit	
	Fazli Erdem	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 2, 3, 4-8, 9, 10-12, 16, 17, 18, 19, 20, 21, and 30 rejected under 35 U.S.C. 103(a) as being unpatentable over Lieber et al. (US 2002/0130311 A1) in view of John et al. (US 2002/0074537 A1) further in view of Avouris et al. (6,423,583) further in view of Lafrate et al. (5,705,824) further in view of Pelrine et al. (US 2002/0008445 A1).

Regarding Claims 2, 3, 4-8, 9, 10-12, 16, 17, 18, 19, 20, 21, and 30, Lieber et al. disclose a doped elongated semiconductors, growing such semiconductors, devices including such semiconductors and fabricating such devices where the elongates semiconductor device has nanometer geometries. Lieber et al. does not explicitly show the energy band structure, application of electric field in such devices, and the required electric field characteristics. However, John. et al. show electro-actively tunable photonic bandgap materials. Furthermore, Avouris et al. disclose a methodology for electrically induced selective breakdown of nanotubes and Lafrate et al. show a field controlled current modulators based on tunable barrier strengths where the electric field is applied in the specific configuration. Furthermore, Pelrine et al. disclose an energy efficient electroactive polymers and electroactive polymer devices where the required electric field characteristics disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include band-gap structure, specified electric field application and the required electric field characteristics in Lieber et al. as taught by John et al., Avouris et al., and Lafrate et al., and Pelrine et al. respectively in order to have a nanostructures with easier controllability.

2. Claims 13, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lieber et al. (US 2002/0130311 A1) in view of John et al. (US 2002/0074537 A1) further in view of Avouris et al. (6,423,583) further in view of Lafrate et al. (5,705,824) further in view of Huth (5,689,603) further in view of Pelrine et al. (US 2002/0008445 A1).

Regarding Claims 13, 22 and 23 Lieber et al., John et al., Avouris et al., and Lafrate et al. combination fail to show the optical absorption structure and the required electric field characteristics. However, Huth discloses an optically interactive nanostructure where the optical absorption structure is shown. Furthermore, Pelrine et al. disclose an energy efficient electroactive polymers and electroactive polymer devices where the required electric field characteristics is disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the optical absorption structure and the required electric field characteristics in Lieber et al., John et al., Avouris et al., and Lafrate et al., as taught by Huth and Pelrine et al. in order to provide a nanostructure with better optical characteristics.

3. Claims 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lieber et al. (US 2002/0130311 A1) in view of John et al. (US 2002/0074537 A1) further in view of Avouris et al. (6,423,583) further in view of Lafrate et al. (5,705,824) further in view of Rothberg (6,153,318) further in view of Pelrine et al. (US 2002/0008445 A1).

Regarding Claim 24, Lieber et al., John et al., Avouris et al., and Lafrate et al. combination fail to disclose physical property alteration of the semiconductor device and the required electric field characteristics. However, Rothberg discloses a layered material having properties that are variable by an applied electric field where the physical property of the smeiconductor device is explained. Furthermore, Pelrine et al. disclose an energy efficient electroactive polymers and electroactive polymer devices where the required electric field characteristics is disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include electric field induced physical property changing structure of the semiconductor device in Lieber et al., John et al., Avouris et al., and Lafrate et al., as taught by Rothber in order to provide a nanostructure with better flexibility.

4. Claims 14, 15, 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lieber et al. (US 2002/0130311 A1) in view of John et al. (US 2002/0074537 A1) further in view of Avouris et al. (6,423,583) further in view of Lafrate et al. (5,705,824) further in view of Noetzel et al. (5,714,765) further in view of Pelrine et al. (US 2002/0008445 A1).

Regarding Claims 14, 15, 25-28, Lieber et al., John et al., Avouris et al., and Lafrate et al. fail to disclose the specified quantum well structure and the required electric field characteristics.

However, Noetzel et al. disclose a method of fabricating a compositional semiconductor device where the quantum well structure is shown. Furthermore, Pelrine et al. disclose an energy efficient electroactive polymers and electroactive polymer devices where the required electric field characteristics is disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the quantum well structure and the required electric field characteristics in Lieber et al., John et al., Avouris et al., and Lafrate et al. combination as taught by Noetzel et al., and Pelrine et al. respectively, in order to have a semiconductor device of better functionality.

5. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lieber et al. (US 2002/0130311 A1) in view of John et al. (US 2002/0074537 A1) further in view of Avouris et al. (6,423,583) further in view of Lafrate et al. (5,705,824) further in view of Noetzel et al. (5,714,765) further in view of Katoh et al. (6,333,516) further in view of Pelrine et al. (US 2002/0008445 A1).

Regarding Claim 29, Lieber et al., John et al., Avouris et al., Lafrate et al., and Noetzel et fail to disclose the ion structure and the required electric field characteristics. However, Katoh et al. disclose a quantum effect device where the specified ion structure is shown. Furthermore, Pelrine et al. disclose an energy efficient electroactive polymers and electroactive polymer devices where the required electric field characteristics is disclosed.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the ion structure and the electric field characteristics in Lieber et

al., John et al., Avouris et al., Lafrate et al., and Noetzel et al. combination as taught by Katoh et al. and Pelrine et al. respectively in order to have a semiconductor device of small geometry.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fazli Erdem whose telephone number is (703) 305-3868. The examiner can normally be reached on M - F 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

FE
May 3, 2003

NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800